

The Examiner is respectfully requested to amend the above-identified application as follows:

IN THE SPECIFICATION:

A substitute specification, with no markings, and a substitute specification, with markings, showing the changes made thereto are enclosed.

IN THE CLAIMS:

Please amend Claims 1-5, 7-17, and 20-25 to read as follows (a marked-up version of the amended claims, showing the changes made thereto, is attached).

a 1. (Amended) A printing apparatus scanning a printing head over a printing medium a plurality of times, to perform printing upon the print medium during each respective scan and to feed the printing medium a predetermined amount in a direction different from a scanning direction of a carriage, said printhead being mounted on said carriage, said printing apparatus comprising:

means for getting information relating to a printing medium feeding period required for feeding the printing medium for the predetermined amount after completion of printing in a preceding line in a preceding scan;

means for setting a carriage scanning period required to start printing of the next line after completion of printing in said preceding line so as to be substantially equal to said printing medium feeding period depending upon a printing completion position of the preceding line and the printing start position of the next line; and

means for driving said carriage to scan depending upon a period set by said carriage scanning period setting means.

2. (Amended) A printing apparatus scanning a printing head over a printing medium a plurality of times, to perform printing upon the print medium during each respective scan and to feed the printing medium a predetermined amount in a direction different from a scanning direction of a carriage, said printhead being mounted on said carriage, said printing apparatus comprising:

means for getting information relating to a printing medium feeding period required for feeding the printing medium for the predetermined amount after completion of printing in a preceding line in a preceding scan;

means for setting a carriage scanning period required to start printing of the next line after completion of printing in said preceding line so as to be substantially equal to said printing medium feeding period depending upon a printing completion position of the preceding line and the printing start position of the next line; and

means for driving said carriage to scan depending upon a period set by said carriage scanning period setting means,

wherein said carriage scanning period includes at least a first carriage scanning period required for the carriage to reach a predetermined position after completion of printing of the preceding line and a second carriage scanning period required for the carriage to reach the predetermined period at the printing start position of the next line,

said carriage scanning period setting means takes a difference between a said printing medium feeding period and a sum of said first carriage scanning period and said second carriage scanning period, as a waiting period when a sum of said first carriage scanning period and said second carriage scanning period is less than said printing medium feeding period,

said carriage driving means maintains stopping the carriage for said

waiting period after deceleration and stopping of the carriage according to said first carriage scanning period after completion of printing of the preceding line.

3. (Amended) A printing apparatus scanning a printing head over a printing medium a plurality of times, to perform printing upon the print medium during each respective scan and to feed the printing medium a predetermined amount in a direction different from a scanning direction of a carriage, said printhead being mounted on said carriage, said printing apparatus comprising:

means for getting information relating to a printing medium feeding period required for feeding the printing medium for the predetermined amount after completion of printing in a preceding line in a preceding scan;

means for setting a carriage scanning period required to start printing of the next line after completion of printing in said preceding line so as to be substantially equal to said printing medium feeding period depending upon a printing completion position of the preceding line and the printing start position of the next line; and

means for driving said carriage to scan depending upon a period set by said carriage scanning period setting means,

wherein said carriage scanning period includes at least a first carriage scanning period required for the carriage to reach a predetermined position after completion of printing of the preceding line and a second carriage scanning period required for the carriage to reach the predetermined period at the printing start position of the next line,

said carriage scanning period setting means sets a scanning speed of said carriage so that a sum of said first carriage scanning period and said second carriage scanning period becomes equal to said printing medium feeding period, and

said carriage driving means drives a carriage scanning depending upon the scanning speed of the carriage set by said carriage scanning period setting means.

4. (Amended) A printing apparatus scanning a printing head over a printing medium a plurality of times, to perform printing upon the print medium during each respective scan and to feed the printing medium a predetermined amount in a direction different from a scanning direction of a carriage, said printhead being mounted on said carriage, said printing apparatus comprising:

means for getting information relating to a printing medium feeding period required for feeding the printing medium for the predetermined amount after completion of printing in a preceding line in a preceding scan;

means for getting information relating to a carriage scanning period from an end position of printing of the preceding line to a start position of printing of the next line in a scanning direction of the carriage; and

means for driving said carriage to scan to start printing of the next line, after completion of printing in said preceding line, depending upon a relationship between said carriage scanning period and said printing medium feeding period.

5. (Amended) A printing apparatus scanning a printing head over a printing medium a plurality of times, to perform printing upon the print medium during each respective scan and to feed the printing medium a predetermined amount in a direction different from a scanning direction of a carriage, said printhead being mounted on said carriage, said printing apparatus comprising:

means for getting information relating to a printing medium feeding period required for feeding the printing medium for the predetermined amount after

completion of printing in a preceding line in a preceding scan;

means for getting information relating to a carriage scanning period from an end position of printing of the preceding line to a start position of printing of the next line in a scanning direction of the carriage; and

means for driving said carriage to scan to start printing of the next line, after completion of printing in said preceding line, depending upon a relationship between said carriage scanning period and said printing medium feeding period,

wherein said carriage driving means does not vary a scanning speed of said carriage even after completion of printing of said preceding line when said carriage scanning period is longer than said printing medium feeding period.

a1
(concluded)
PC1

7. (Amended) A printing apparatus as claimed in claim 4, wherein said carriage driving means provides a zone to decelerate the carriage for a predetermined period so that said carriage scanning period becomes equal to said printing medium feeding period when said carriage scanning period is less than said printing medium feeding period, and accelerates said carriage to reach the printing start position at a predetermined speed after scanning said carriage at a decelerated speed after completion of printing of the preceding line.

a2

8. (Amended) A printing apparatus scanning a printing head over a printing medium a plurality of times, to perform printing upon the print medium during each respective scan and to feed the printing medium a predetermined amount in a direction different from a scanning direction of a carriage, said printhead being mounted on said carriage, said printing apparatus comprising:

means for getting information relating to a printing medium feeding

period required for feeding the printing medium for the predetermined amount after completion of printing in a preceding line in a preceding scan;

means for setting a carriage scanning period required to start printing of the next line after completion of printing in said preceding line in said preceding scan so as to be substantially equal to said printing medium feeding period depending upon a printing completion position of the preceding line and the printing start position of the next line; and

means for driving said carriage to scan depending upon a period set by said carriage scanning period setting means.

9. (Amended) A printing apparatus scanning a printing head over a printing medium a plurality of times, to perform printing upon the print medium during each respective scan and to feed the printing medium a predetermined amount in a direction different from a scanning direction of a carriage, said printhead being mounted on said carriage, said printing apparatus comprising:

means for getting information relating to a printing medium feeding period required for feeding the printing medium for the predetermined amount after completion of printing in a preceding line in a preceding scan;

means for setting a carriage scanning period required to start printing of the next line after completion of printing in said preceding line in said preceding scan so as to be substantially equal to said printing medium feeding period depending upon a printing completion position of the preceding line and the printing start position of the next line; and

means for driving said carriage to scan depending upon a period set by said carriage scanning period setting means,

wherein said carriage scanning period includes at least a first carriage scanning period required for stopping the carriage at a predetermined position after completion of printing of the preceding line, a carriage return period required for effecting a scanning in said predetermined direction and returning the carriage in reverse direction to stop at the predetermined position, and a second carriage scanning period required for the carriage to reach at the predetermined speed to the printing start position of the next line from a predetermined position stopping after carriage return,

said carriage scanning period setting means takes a difference between a sum of said first carriage scanning period and said carriage return period and said second carriage scanning period, and a printing medium feeding period as a waiting period when a sum of said first carriage scanning period and said carriage return period and said second carriage scanning period is less than said printing medium feeding period,

said carriage driving means maintains stopping the carriage for said waiting period after carriage return.

10. (Amended) A printing apparatus scanning a printing head over a printing medium a plurality of times, to perform printing upon the print medium during each respective scan and to feed the printing medium a predetermined amount in a direction different from a scanning direction of a carriage, said printhead being mounted on said carriage, said printing apparatus comprising:

means for getting information relating to a printing medium feeding period required for feeding the printing medium for the predetermined amount after completion of printing in a preceding line in a preceding scan;

means for setting a carriage scanning period required to start printing of the next line after completion of printing in said preceding line in a preceding scan so as

to become equal to said printing medium feeding period depending upon a printing completion position of the preceding line and the printing start position of the next line; and

means for driving said carriage to scan depending upon a period set by said carriage scanning period setting means.

11. (Amended) A printing apparatus scanning a printing head over a printing medium a plurality of times, to perform printing upon the print medium during each respective scan and to feed the printing medium a predetermined amount in a direction different from a scanning direction of a carriage, said printhead being mounted on said carriage, said printing apparatus comprising:

means for getting information relating to a printing medium feeding period required for feeding the printing medium for the predetermined amount after completion of printing in a preceding line in a preceding scan;

means for setting a carriage scanning period required to start printing of the next line after completion of printing in said preceding line in a preceding scan so as to become equal to said printing medium feeding period depending upon a printing completion position of the preceding line and the printing start position of the next line; and

means for driving said carriage to scan depending upon a period set by said carriage scanning period setting means,

wherein said carriage scanning period includes at least a first carriage scanning period required for the carriage to stop at a predetermined position after completion of printing in a predetermined direction, a recovery process period required for performing recovery process of the printing head at the predetermined position and a

second carriage scanning period required for the carriage to reach the printing start position of the next line by scanning the carriage in a direction opposite to scanning of said predetermined direction from said predetermined position after finishing of the recovery process,

said carriage scanning period setting means takes a difference between a sum of said first carriage scanning period, a recovery period and said second carriage scanning period, and said printing medium feeding period as a waiting period when a sum of said first carriage scanning period, said recovery period and said second carriage scanning period is less than said printing medium feeding period,

said carriage driving means stops the carriage for said waiting period after finishing said recovery process.

12. (Amended) A printing apparatus scanning a printing head over a printing medium a plurality of times, to perform printing upon the print medium during each respective scan and to feed the printing medium a predetermined amount in a direction different from a scanning direction of a carriage, said printhead being mounted on said carriage, said printing apparatus comprising:

means for getting information relating to a printing medium feeding period required for feeding the printing medium for the predetermined amount after completion of printing in a preceding line in a preceding scan;

means for setting a carriage scanning period required to start printing of the next line after completion of printing in said preceding line in a preceding scan so as to become equal to said printing medium feeding period depending upon a printing completion position of the preceding line and the printing start position of the next line; and

means for driving said carriage to scan depending upon a period set by said carriage scanning period setting means,

wherein said carriage scanning period includes at least a first carriage scanning period required for the carriage to stop at a predetermined position after completion of printing in a predetermined direction, a recovery process period required for performing recovery process of the printing head at the predetermined position and a second carriage scanning period required for the carriage to reach the printing start position of the next line by scanning the carriage in a direction opposite to scanning of said predetermined direction from said predetermined position after finishing of the recovery process,

said carriage scanning period setting means takes said printing medium a difference between a sum of said first carriage scanning period, a recovery period and said second carriage scanning period, and said printing medium feeding period as a waiting period when a sum of said first carriage scanning period, said recovery period and said second carriage scanning period is less than said printing medium feeding period,

said carriage driving means for performing said recovery process after stopping the carriage for said waiting period.

13. (Amended) A carriage scan driving method using a printing apparatus scanning a printing head over a printing medium a plurality of times, to perform printing upon the print medium during each respective scan and to feed the printing medium a predetermined amount in a direction different from a scanning direction of a carriage, the carriage being used to mount the print head, said printing apparatus comprising:

a step of getting information relating to a printing medium feeding

period required for feeding the printing medium for the predetermined amount after completion of printing in a preceding line in a preceding scan;

a step of setting a carriage scanning period required to start printing of the next line after completion of printing in the preceding line so as to be substantially equal to said printing medium feeding period depending upon a printing completion position of the preceding line and the printing start position of the next line; and

a step of driving the carriage to travel depending upon a period set by said carriage scanning period setting step.

14. (Amended) A carriage scan driving method using a printing apparatus scanning a printing head over a printing medium a plurality of times, to perform printing upon the print medium during each respective scan and to feed the printing medium a predetermined amount in a direction different from a scanning direction of a carriage, the carriage being used to mount the print head, said printing apparatus comprising:

a step of getting information relating to a printing medium feeding period required for feeding the printing medium for the predetermined amount after completion of printing in a preceding line in a preceding scan;

a step of setting a carriage scanning period required to start printing of the next line after completion of printing in the preceding line so as to be substantially equal to said printing medium feeding period depending upon a printing completion position of the preceding line and the printing start position of the next line; and

a step of driving the carriage to travel depending upon a period set by said carriage scanning period setting step,

wherein said carriage scanning period includes at least a first

carriage scanning period required for the carriage to reach a predetermined position after completion of printing of the preceding line and a second carriage scanning period required for the carriage to reach the predetermined period at the printing start position of the next line,

said carriage scanning period setting step takes a difference between a the printing medium feeding period and a sum of the first carriage scanning period and the second carriage scanning period, as a waiting period when a sum of said first carriage scanning period and said second carriage scanning period is less than said printing medium feeding period,

said carriage driving step maintains stopping the carriage for said waiting period after deceleration and stopping of the carriage according to said first carriage scanning period after completion of printing of the preceding line.

15. (Amended) A carriage scan driving method using a printing apparatus scanning a printing head over a printing medium a plurality of times, to perform printing upon the print medium during each respective scan and to feed the printing medium a predetermined amount in a direction different from a scanning direction of a carriage, the carriage being used to mount the print head, said printing apparatus comprising:

a step of getting information relating to a printing medium feeding period required for feeding the printing medium for the predetermined amount after completion of printing in a preceding line in a preceding scan;

a step of setting a carriage scanning period required to start printing of the next line after completion of printing in the preceding line so as to be substantially equal to said printing medium feeding period depending upon a printing completion

position of the preceding line and the printing start position of the next line; and

a step of driving the carriage to travel depending upon a period set by said carriage scanning period setting step,

wherein said carriage scanning period includes at least a first carriage scanning period required for the carriage to reach a predetermined position after completion of printing of the preceding line and a second carriage scanning period required for the carriage to reach the predetermined period at the printing start position of the next line,

said carriage scanning period setting step sets a scanning speed of said carriage so that a sum of said first carriage scanning period and said second carriage scanning period becomes equal to said printing medium feeding period, and

said carriage driving step controls carriage scanning depending upon a scanning speed of the carriage set by said carriage scanning period setting step.

16. (Amended) A carriage scan driving method using a printing apparatus scanning a printing head over a printing medium a plurality of times, to perform printing upon the print medium during each respective scan and to feed the printing medium a predetermined amount in a direction different from a scanning direction of a carriage, the carriage being used to mount said print head, said printing apparatus comprising:

a step of getting information relating to a printing medium feeding period required for feeding the printing medium for the predetermined amount after completion of printing in a preceding line in a preceding scan;

a step of getting information relating to a scanning period of the carriage from completion position of printing of the preceding line to start position of

printing of next line in a scanning direction of the carriage; and

a step of driving said carriage to scan to start printing of the next line after completion of printing in said preceding line depending upon a relationship between said carriage scanning period and said printing medium feeding period.

17. (Amended) A carriage scan driving method using a printing apparatus scanning a printing head over a printing medium a plurality of times, to perform printing upon the print medium during each respective scan and to feed the printing medium a predetermined amount in a direction different from a scanning direction of a carriage, the carriage being used to mount said print head, said printing apparatus comprising:

a step of getting information relating to a printing medium feeding period required for feeding the printing medium for the predetermined amount after completion of printing in a preceding line in a preceding scan;

a step of getting information relating to a scanning period of the carriage from completion position of printing of the preceding line to start position of printing of next line in a scanning direction of the carriage; and

a step of driving said carriage to scan to start printing of the next line after completion of printing in said preceding line depending upon a relationship between said carriage scanning period and said printing medium feeding period,

wherein said carriage driving step does not vary a scanning speed of said carriage even after completion of printing of preceding line when said carriage scanning period is longer than said printing medium feeding period.

20. (Amended) A carriage scan driving method using a printing

apparatus scanning a printing head over a printing medium a plurality of times, to perform printing upon the print medium during each respective scan and to feed the printing medium a predetermined amount in a direction different from a scanning direction of a carriage, the carriage being used to mount said print head, said printing apparatus comprising:

a step of getting information relating to a printing medium feeding period required for feeding the printing medium for the predetermined amount after completion of printing in a preceding line in a preceding scan;

a step of setting a carriage scanning period required to start printing of the next line after completion of printing in said preceding line in said preceding scan so as to be substantially equal to said printing medium feeding period depending upon a printing completion position of the preceding line and the printing start position of the next line; and

a step of driving said carriage to scan depending upon a period set by said carriage scanning period setting step.

21. (Amended) A carriage scan driving method using a printing apparatus scanning a printing head over a printing medium a plurality of times, to perform printing upon the print medium during each respective scan and to feed the printing medium a predetermined amount in a direction different from a scanning direction of a carriage, the carriage being used to mount said print head, said printing apparatus comprising:

a step of getting information relating to a printing medium feeding period required for feeding the printing medium for the predetermined amount after completion of printing in a preceding line in a preceding scan;

a step of setting a carriage scanning period required to start printing of the next line after completion of printing in said preceding line in said preceding scan so as to be substantially equal to said printing medium feeding period depending upon a printing completion position of the preceding line and the printing start position of the next line; and

a step of driving said carriage to scan depending upon a period set by said carriage scanning period setting step,

wherein said carriage scanning period includes at least a first carriage scanning period required for stopping the carriage at a predetermined position after completion of printing of the preceding line, a carriage return period required for effecting scanning in said predetermined direction and returning the carriage in reverse direction to stop at the predetermined position, and a second carriage scanning period required for the carriage to reach at the predetermined speed to the printing start position of the next line from a predetermined position stopping after carriage return,

said carriage scanning period setting step takes a difference between a sum of said first carriage scanning period and said carriage return period and said second carriage scanning period, and a printing medium feeding period as a waiting period when a sum of said first carriage scanning period and said carriage return period and said second carriage scanning period is less than said printing medium feeding period,

said carriage driving step maintains stopping the carriage for said waiting period after carriage return.

22. (Amended) A carriage scan driving method using a printing apparatus scanning a printing head over a printing medium a plurality of times, to perform printing upon the print medium during each respective scan and to feed the printing

medium a predetermined amount in a direction different from a scanning direction of a carriage the carriage being used to mount the print head, wherein a recovery process of the printing head at a predetermined position is performed per scan in a predetermined direction of said carriage, said printing apparatus comprising:

a step of getting information relating to a printing medium feeding period required for feeding the printing medium for the predetermined amount after completion of printing in a preceding line in a preceding scan;

a step of setting a carriage scanning period required to start printing of the next line after completion of printing in said preceding line in a preceding scan so as to become equal to said printing medium feeding period depending upon a printing completion position of the preceding line and the printing start position of the next line; and

a step of driving said carriage to scan depending upon a period set by said carriage scanning period setting step.

23. (Amended) A carriage scan driving method using a printing apparatus scanning a printing head over a printing medium a plurality of times, to perform printing upon the print medium during each respective scan and to feed the printing medium a predetermined amount in a direction different from a scanning direction of a carriage the carriage being used to mount the print head, wherein a recovery process of the printing head at a predetermined position is performed per scan in a predetermined direction of said carriage, said printing apparatus comprising:

a step of getting information relating to a printing medium feeding period required for feeding the printing medium for the predetermined amount after completion of printing in a preceding line in a preceding scan;

a step of setting a carriage scanning period required to start printing of the next line after completion of printing in said preceding line in a preceding scan so as to become equal to said printing medium feeding period depending upon a printing completion position of the preceding line and the printing start position of the next line; and

a step of driving said carriage to scan depending upon a period set by said carriage scanning period setting step;

wherein said carriage scanning period includes at least a first carriage scanning period required for the carriage to stop at a predetermined position after completion of printing in a predetermined direction, a recovery process period required for performing recovery process of the printing head at the predetermined position and a second carriage scanning period required for the carriage to reach the printing start position of the next line by scanning the carriage in a direction opposite to scanning of said predetermined direction from said predetermined position after finishing of the recovery process,

said carriage scanning period setting step takes said printing medium a difference between a sum of said first carriage scanning period, a recovery period and said second carriage scanning period, and said printing medium feeding period as a waiting period when a sum of said first carriage scanning period, said recovery period and said second carriage scanning period is less than said printing medium feeding period,

said carriage driving step stops the carriage for said waiting period after said recovery process.

24. (Amended) A carriage scan driving method using a printing apparatus scanning a printing head over a printing medium a plurality of

times, to perform printing upon the print medium during each respective scan and to feed the printing medium a predetermined amount in a direction different from a scanning direction of a carriage the carriage being used to mount the print head, wherein a recovery process of the printing head at a predetermined position is performed per scan in a predetermined direction of said carriage, said printing apparatus comprising:

a step of getting information relating to a printing medium feeding period required for feeding the printing medium for the predetermined amount after completion of printing in a preceding line in a preceding scan;

a step of setting a carriage scanning period required to start printing of the next line after completion of printing in said preceding line in a preceding scan so as to become equal to said printing medium feeding period depending upon a printing completion position of the preceding line and the printing start position of the next line; and

a step of driving said carriage to scan depending upon a period set by said carriage scanning period setting step,

wherein said carriage scanning period includes at least a first carriage scanning period required for the carriage to stop at a predetermined position after completion of printing in a predetermined direction, a recovery process period required for performing recovery process of the printing head at the predetermined position and a second carriage scanning period required for the carriage to reach the printing start position of the next line by scanning the carriage in a direction opposite to a scanning of said predetermined direction from said predetermined position after finishing of the recovery process,

said carriage scanning period setting step takes a difference between a sum of said first carriage scanning period, a recovery period and said second carriage

scanning period, and said printing medium feeding period as a waiting period when a sum of said first carriage scanning period, said recovery period and said second carriage scanning period is less than said printing medium feeding period,

said carriage driving step performs said recovery process after stopping the carriage for said waiting period.

25. (Amended) A printing method performing printing on a printing medium with a primary scan of a printing head over a printing medium a plurality of times, and with an auxiliary scan of said printing medium and said carriage in a direction different from the direction of the primary scan, the method comprising:

a printing step of performing printing in a leading primary scan;

a step of performing said auxiliary scan after completion of said printing step and before initiation of printing step in a primary scan;

wherein a period required for said primary scan from a printing completion position of a printing step in a said leading primary scan to a printing start position of a printing step in a next primary scan is substantially equal to a period required for said auxiliary scan.

A3
(concluded)

Sub
C2